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(19)


## (54) REEL GAME BLINKER SHUTTER AND CIRCUIT


(71) We, BALLY MANUFACTURING CORPORATION, a corporation organised and existing under the laws of the State of Delaware, United States of America, of 2640 West Belmont Avenue, Chicago, Illinois 60618, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—


The described invention relates to amusement and game apparatus of the rotating reel type wherein symbol or indicia-bearing reels are set spinning and allowed to come to rest in variant chance-governed positions in which the symbols displayed in each game or playing cycle may or may not indicate and determine winning score or award conditions.

The action is preferably such that the reels are caused to stop more or less abruptly in the viewing position and in a sequence from left to right in a manner contrived to heighten interest and suspense in anticipating what the score might turn out to be. This suspense element is further enhanced in some machines by the provision of symbol-masking shutter means in association with at least one reel (usually the last to come to rest) and operative to conceal the symbol thereof until such time as the shutter is caused to open by special control means which may be rendered effective or operation by the player at his election as the result of attaining some particular award or high-score condition by those reels which are not masked.

A further scoring feature in prior arrangements of this type may afford the player the option to accept the award or score displayed by the unmasked reels without actuating the shutter-opening means; or the player may take his option and open the shutter to reveal the masked symbol and resultant new score and in such case, if the new display does not augment the previous score awarded on the unmasked reels, the entire score may be nullified, in which case taking the unmasking option involves risk.

In still other arrangements the acceptance of the option to cause the shutter means to open and unmask the mystery symbol may or may not reveal a change in the ultimate score award, but in either event will not result in cancellation of the initial score regardless of what the unmasked symbol turns out to be.

The functional and structural aspects of prior masking shutter mechanisms have heretofore commonly involved a single binder plate moving angularly or linearly either by manual or automatic means in arrangements such as disclosed in U.S. Patent 3,642,287, or its counterpart, British Patent No. 1,262,134, both disclosing angularly movable reel shutters, or U.S. Patent No. 1,978,395 (Groetchen) which discloses a manually-released linearly displaced shutter.

According to the present invention a reel type game apparatus includes symbol-bearing reels and reel-actuating mechanism operative in game cycles to spin and index the same to different symbol-displaying positions; and shutter means cooperatively disposed relative to a reel and having open and closed conditions for concealing or displaying symbols thereon, said shutter means including two shutter members coacting to converge and diverge to said closed and open conditions together with motor actuating and control circuit means therefor operative to displace the members in said movements for display of a symbol selectively in a steady-state open condition or a masked condition, as well as in a blinking action sequence at a pre-determined time during a game cycle.

Preferably the symbol-masking and displaying shutter means comprises two shutter elements preferably coaxially mounted with the reels for oscillation along the face of the reels in converging and diverging symbol-masking and displaying blinker action, together with spring means normally urging the same convergently to closed masking condition, and motor-driven cycle means operative to diverge the shutter elements and effect reclosure thereof in each cycle of operation thereof,

together with control circuit means cooperative with reel-mechanism circuit control means to cause the shutters to blink open and closed at least once and thereafter remain closed during each reel-spinning cycle; with option circuit means actuated by the player when automatically rendered operative at certain times, whereby to cause the shutter elements to move into and remain in open symbol-displaying condition followed by automatic reclosure thereafter as a function of initiation of a new reel-spinning cycle.

In accordance with another aspect of the invention, the reel-spinning game apparatus has at least one symbol-bearing reel and spinning mechanism operative in game cycles to cause spinning and coming to rest of said reel in a display position in which one of a plurality of reel symbols is positioned for viewing, together with timing switch means operative in predetermined phases of each game cycle in respect to the starting and stopping of reel spinning action, the improvement comprising: shutter means movable to and from symbol-obscuring and exposing positions relative to said display position and symbol displayed thereat; shutter actuating means including an electric motor operative to effect movements of said shutter means as aforesaid; and circuit means including shutter switch means operative in step with said shutter actuating means and under control of said timing switch means in each game cycle to cause predetermined changes in the symbol-obscuring and exposing positions of the shutter means.

The invention is exemplified by detailed aspects of the construction, mounting and action of the shutter elements themselves, all in accordance with the following description taken in view of the annexed drawings in which:

Figure 1 is a front elevation of an illustrative type of reel game apparatus embodying the present shutter improvements;

Figure 2 is a cross-sectional view through the reel mechanism with parts of the reel-spinning means and award control means shown in elevation, and shutter control features shown in block diagram;

Figure 3 is a circuit diagram with parts of the masked reel and shutter mechanism shown fragmentally in exploded perspective;

Figure 4 is a side elevation of the reel mechanism chassis viewed from the side opposite that of Figure 2.

In accordance with the embodiment depicted in Figure 1, the illustrative amusement machine may employ three ordinary or non-shuttered reels 10, 11 and 12, and a fourth reel 13 equipped with the blinker shutter means in a form comprising upper and lower curved shutter elements 16 and 17 respectively carried on rocker arms 16A and 17A (Figure 2) oscillable on and concentrically with the main reel shaft 14.

The shutter arms are yieldingly drawn toward each other by spring means 19 urging the same convergently to a limit in which each arm is drawn against one of two stud rollers 21A or 21B situated in diametrically opposite positions on the face of a motor-driven rotor disc 20 to project into space between the edges of the rocker arms in a manner to serve both as limiting stops and a means for wedging the arms apart responsive to rotation of the control disc by a small motor 30 of a type including a built-in reduction gear means.

Thus, referring to Figure 3 and assuming that the motor 30 rotates the control or rotor disc 20 in the direction indicated, it will be evident that when the two arm-driving stud rollers turn into approximately vertical alignment, the arms 16A and 17A will be separated a maximum amount and the two shutter elements 16 and 17 will then stand in the relatively open condition to display the indicia or symbol —S—; but if the motor is permitted or selectively caused to run until the stud rollers turn into approximately horizontal alignment or 90° from such open condition, the shutter elements will then be in a closed condition to mask the symbol as in Figure 1.

As viewed in Figure 3, the control or cycle disc 20 is provided with two diametrically-situated switch-controlling cam slots 24 and 25, each in radial alignment with one of the stud rollers, and there are two sensitive snap-acting motor control switches 28 and 29 disposed on a mounting plate 26 attached to the reel mechanism chassis, as at 27, and also serving to support the shutter motor. Each said motor switch is provided with an actuating arm and cam roller means 28A and 29A respectively riding the periphery of the control disc to maintain the appertaining switch in a first circuit condition responsive to further disc rotation, but dropping into one of the notches 24 or 25 to change to a second circuit condition.

Shutter control switches 28 and 29 are connected in a motor control circuit for actuation cooperatively with master reel-circuit means, according to the circuit diagram to be described hereafter and as functionally depicted in Figure 2, in such manner as to cause the shutter means to blink open and closed at certain times, to stand open or closed at other times, or be openable at the election of the player at still other times, dependently upon certain reel-spinning and award conditions, as hereafter explained.

It is to be assumed, with reference to Figure 1, that the apparatus is normally confined within a cabinet 15 and behind a locked door 15A equipped with a sight opening or

window portion 18 through which one horizontal row of reel symbols will be displayed to view, the reel spinning mechanism being adapted for coin-released operation such that upon deposit of a suitable coin in the slot 22, the actuating handle 23 is freed for effective operation to set the reels spinning in known manner for the duration of one game or play cycle.

When the handle 23 is actuated as aforesaid, all of the reels will be set spinning in like manner, including the masked reel 13 as depicted in Figure 2, with which is associated a corresponding award disc 13A into the periphery of which are cut a series of notches 13B of varying value depth.

As a result of handle actuation, the drive shaft 32 is rocked to withdraw the driving lever and pawl 33 abruptly and flip the roller 33A out of whatever award notch it happens to have been in and thereby spin the reel.

Simultaneously with the aforesaid flipping action of the reel drive pawl, a corresponding sensing and indexing lever 34 is rocked away from the notched disc to withdraw its sensing roller 34A from whatever notch it happens to have been in, so that during the spin it stands in known manner wholly free of the disc in the condition seen in Figure 2 until such time as it is permitted by a timing means to start moving back to stop the disc. The timing means includes a clockwork governor 35, Figure 4, controlling the spring return of shaft 36 which slowly shifts the long link 17 to trip out a notched toggle trigger lever 38 thereby breaking a holding toggle at levers 39 and permitting the sensing lever roller 34A to drop back suddenly into one of the award notches, the depth of which will determine the stopping position of the score award switch wiper 40 on some particular bank of award contacts 41, which action may or may not enable some award circuit depending upon whether the positioning of the other award switch wipers is such as to complete the required award circuit in known manner, as more particularly set out in the aforementioned U.S. Patent No. 3,642,287, or in still greater detail in U.S. Patent No. 2,579,241, it being understood that like actuating and award circuit components and operations are provided for each reel.

Whenever a reel-spinning cycle is initiated and terminated, as aforesaid, certain reel-mechanism supervisory switches, known as the A, B, C and D switches (seen on the side of the chassis in Figure 4) are actuated in known manner in a certain sequence and timing, as the result of the initial advance and slow return of the main drive shaft 32 and rocking of the crank 44 and its links 43 and 42 to displace their corresponding switch pins 42A, 44A for actuation of said switches at a rate and during an interval of reel spinning action regulated by the governor 35 while the aforesaid spinning and toggle triggering operations are going forward, said supervisory switches having other functions related to the operation of the reel mechanism and award system in known manner, but also serving in part to provide control signals for the shutter mechanism, as will appear.

A generalized statement of operation of the blinking shutter action is given with reference to the functional block diagram of Figure 2, beginning with actuation by handle 23 of the "Coin-Released Reel-Spinning and Indexing Mechanism" (I), which results in a setting and triggering of the Spring Driven Shaft 32 to actuate the reel-spinning pawl means as previously described in accompaniment with the governor-regulated return action of the long toggle triggering bar 37 (toward the right in Figure 2, whereby the sequential tripping out of each of the reel indexing pawls stops the reels sequentially and determines award possibilities in the manner previously described.

Should the shutter be left standing in open condition from a previous game cycle, initial operation of the "Reel-Switch —A— Shutter Closing Circuit" (II) will pulse the shutter motor 30 through a 90° transit to reclose the shutter before or substantially at the moment the reels start spinning, and during the ensuing spin Reel Switches —B— and —D— of the "Reel Switches —B— and —D— Blinking Ckt." (III) will cycle the shutter motor again through a 180° phase to produce a quickly sequential opening and reclosing blinking action which will preferably be completed prior to the time the masked reel is finally indexed into its new display position on stoppage of this reel.

If the first three or other number of unmasked reels 10, 11 and 12 do not happen to index in a winning combination, nothing further occurs and the game cycle may be considered terminated. But if the notch-indexed award means 40, 41 for the respective reels determines a winning score, a "Win Score Relay Ckt." (IV) is then actuated which, among other possible results, will condition an "Optional Shutter Switch" (V) for actuation at the discretion of the player to actuate the shutter motor for one further 90° advance of the shutter operating rotor or disc 20, thereby opening the shutter and preferably leaving it in such condition until the next game cycle is initiated, under control of the "Optional Shutter Motor Circuit" (VI).

The blinking shutter action is equally adaptable to enhance suspense and player interest in conjunction with other scoring arrangements, such as the "Hold and Draw" features and operating mechanisms disclosed in the aforesaid U.S. Patents Nos. 3,642,287 and 2,579,241, whereby a score gained in an initial spin may be optionally held in part and possibly improved by a further non-coin reel

operation with various shutter-opening options, depending, as in the foregoing example, upon what award results are procured and whether or not the player elects to actuate the "optional Shutter Switch" (V).

Assuming with reference to the schematic circuit of Figure 3 that a coin-freed game cycle is duly initiated by pulling the handle 23, the crank 44 (fast on the oscillable drive shaft 32) and timer link 42 set thereby will thereupon first shift toward the left (Figure 4 also) and then abruptly start back toward the right in the timing stroke controlled by the described governor means 35.

At the beginning of this action, the switch pin 44A will momentarily actuate the —A— switch to close certain contacts 50 thereof and provide power on conductor 55 starting the shutter motor to turn the rotor 20. Contacts 28 immediately close, thus allowing the motor to run thereby turning motor 20 through a 90° transit which is terminated by opening of shutter motor contacts 29, whereby the shutter will stand closed before or approximately at the moment the reels begin to rotate.

After the reels are in motion, a blinking shutter action will occur as the result of a transient actuation of the reel switch —B— by a cam lobe 42B on the timing link whereby to provide another shutter control pulse from —B— switch contacts 54 via conductor 55 to start the shutter motor again for a further 90° rotor transit, thereby effecting sequentially a divergence of the shutter elements to their open condition followed immediately by reverse closing movement as the result of preventing the stoppage of the motor which would otherwise occur at this time by the application of a carry-over pulse or conductor 55 resulting from closure of contacts 57 on the "END CYCLE" reel switch —D— just prior to the indexing of the last reel into stopped condition.

If desired, the blinking action can be made rapid and repetitious by increasing the speed of the rotor 20, it being preferable, however, in all blinking action that the shutter shall be caused to stand fully closed before the masked reel comes to rest.

In the illustrative arrangement according to Figure 3 optional opening of the shutter at the election of the player is preferably made dependent upon whether or not the unmasked reels 10, 11, 12 and associated award circuit means 40, 41 determine and display a suitable predetermined winning score or combination of symbols. If they do not, the shutter will not be conditioned for optional opening and the game cycle may be considered at an end if it is not otherwise subject to some other option of the player to accept the basic score awarded, if any.

If, however, a winning score has been achieved, the award circuit means 40, 41 will then actuate an Optional Shutter Motor Circuit by actuating a Win Relay Means 60 which will result, among other possible scoring functions, in closure of contacts 61 to actuate via conductor 62 a Feature Relay 63 closing contacts 64 to connect the player's Shutter Option Switch via conductor 65 for starting of the Shutter Motor from power contacts 66.

Actuation of the enabled Option Switch will cycle the Shutter Motor for a 90° rotor transit to open the shutter and leave it in this condition. Further contact means 67 on the Option Switch may be employed to activate other desired Score Function Means 68. In the event the player elects not to operate the Shutter Option Switch he may actuate a Score Acceptance Switch Means 70 to clear the machine of any remaining award or score options or functions necessary to terminate the game cycle fully.

WHAT WE CLAIM IS:—

1. Reel type game apparatus including symbol-bearing reels and reel-actuating mechanism operative in game cycles to spin and index the same to different symbol-displaying positions; and shutter means cooperatively disposed relative to a reel and having open and closed conditions for concealing or displaying symbols thereon, said shutter means including two shutter members coacting to converge and diverge to said closed and open conditions together with motor actuating and control circuit means therfor operative to displace the members in said movements for display or a symbol selectively in a steady-state open condition or a masked condition, as well as in a blinking action sequence at a predetermined time during a game cycle.

2. Apparatus according to claim 1 further characterized by the provision of score award circuit means including an award circuit and win relay actuated under control of said circuit as a function of indexing of said reels in predetermined angular display conditions; together with manually controlled option switch means conditioned for operation by said win relay to produce a steady-state open condition of said shutter members following a blinking action thereof during a said game cycle.

3. Apparatus as defined in claim 2 further characterized in that said shutter members are mounted for angular movement relative to each other and said one reel and said motor means includes a rotor device cooperable with said members to effect said angular movement to displace the members as aforesaid.

4. Apparatus as set forth in claim 3 further characterized by the provision of supervisory switch means and means actuating the same in timed cooperation with reel movements in each game cycle, together with circuit means governed by said switch means and operative to apply motor-operating control signals to said motor actuating means and produce both

steady-state and blinking operation of the shutter means as aforesaid.

5. Reel-spinning game apparatus having a symbol-bearing reel and spinning mechanism operative in game cycles to cause spinning and coming to rest of said reel in a display position in which one of a plurality of reel symbols is positioned for viewing, together with timing switch means operative in predetermined phases of each game cycle in respect to the starting and stopping of reel spinning action, comprising: shutter means movable to and from symbol-obscuring and exposing positions relative to said display position and symbol displayed thereat; shutter actuating means including an electric motor operative to effect movements of said shutter means as aforesaid; and circuit means including shutter switch means operative in step with said shutter actuating means and under control of said timing switch means in each game cycle to cause predetermined changes in the symbol-obscuring and exposing positions of the shutter means.

6. Apparatus according to claim 5 wherein said changes include in rapid succession a symbol-exposing positioning of the shutter means followed by a symbol obscuring positioning thereof characterized by a blinking action.

7. A method of masking symbol-bearing reels in rotating reel games wherein a reel is set spinning in a game cycle and indexed by chance to a stopping position to display any of a plurality of symbols, characterized by the steps of moving two shutter members angularly and coaxially of said reel for convergent closing and divergent opening action to mask and display respectively a reel symbol in the indexed position of such reel; urging said members convergently to the closed masking condition by a yieldable force; applying to said members by means of a rotor device turning angularly about an axis substantially parallel to the reel axis a superior angularly acting driving force in opposition to said yieldable force to separate the members to said open condition, and thereafter turning said rotor device further to relieve said superior force and cause convergence of the members to a closed condition under urgence of said yielding force.

8. A reel-type game apparatus substantially as described herein with reference to the accompanying drawings.

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3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

Fig. 1.

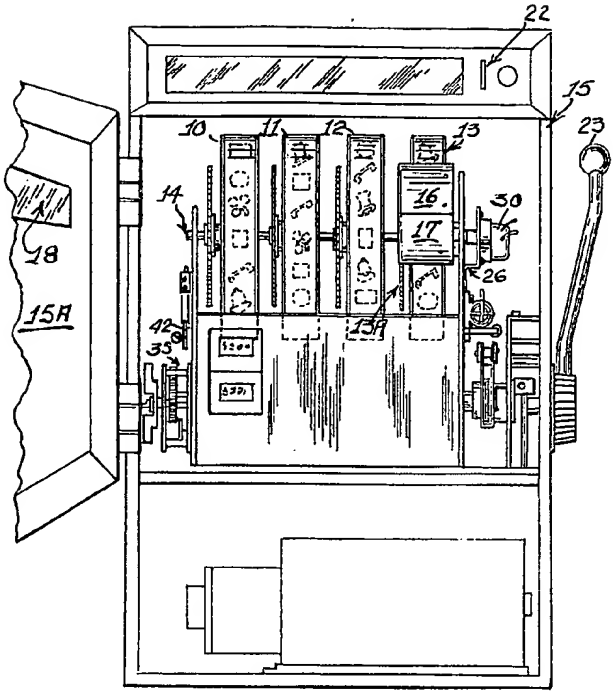



Fig. 4

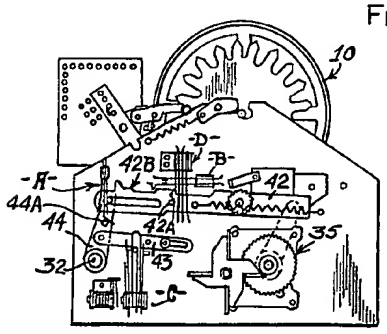
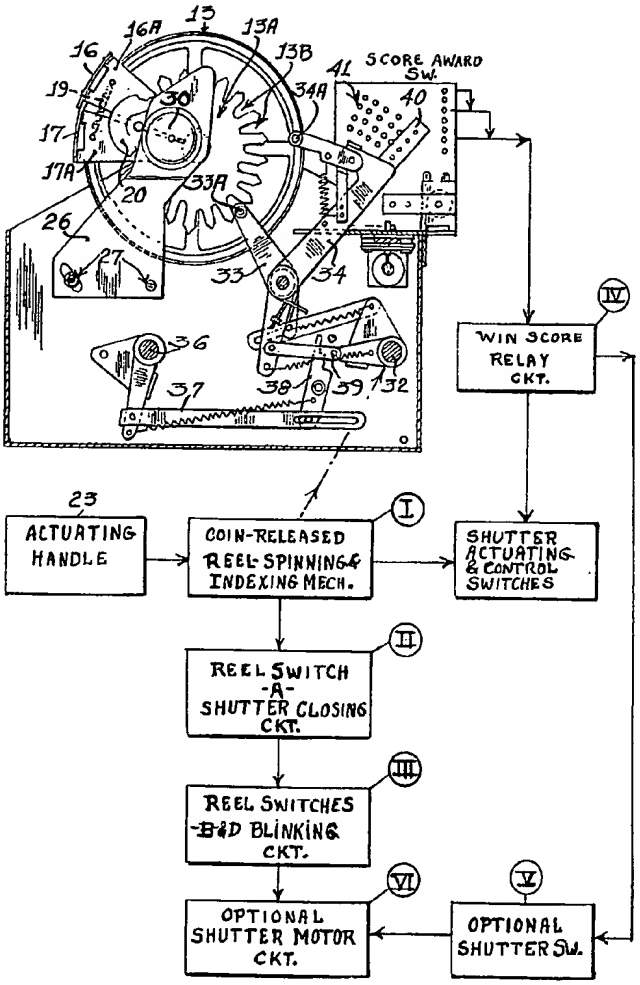


Fig. 2.


15
16A
13A
16
13B
19
30
34A
41
SCORE AWARD SW.
40
17
17A
20
33A
26
27
33
34
36
37
38
39
32
IV
WIN SCORE RELAY CKT.
23
ACTUATING HANDLE
COIN-RELEASED REEL-SPINNING & INDEXING MECH.
I
SHUTTER ACTUATING & CONTROL SWITCHES
II
REEL SWITCH -A- SHUTTER CLOSING CKT.
III
REEL SWITCHES -B&D BLINKING CKT.
VI
OPTIONAL SHUTTER MOTOR CKT.
V
OPTIONAL SHUTTER SW.

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Sheet 3

Fig.3.